TRANS-SIERRAN CLIMATIC CONTACTS DURING THE LAST 12,000 YEARS

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ABSTRACT

The early-Holocene warm period, ca. 9000 years ago, is a realistic analog for the possible effects of greenhouse warming. At that time the vegetation of the western Sierra Nevada resembled that currently found east of the crest. Sagebrush steppe occupied many areas now covered by forest. Precipitation was ca. 65 mm yr^{-1} less, and temperatures were ca. 1°C higher than today. These differences are in the same direction and of the same magnitude as those predicted by the GISS and UofO climatic models for $2XCO_2$. Although the results are less certain, it appears that the eastern Sierra was wetter than today during the early Holocene analog.

These results are based on two numerical techniques, dissimilarity analysis and detrended correspondence analysis, that indicate modern analogs for fossil samples. The best modern analogs for each sample can then be converted into precipitation and temperature estimates using modern lapse rates.

Tourism, water supply, and the logging industry will be negatively effected if climate changes during the next century are in the direction and magnitude of those of the early Holocene. Increased precipitation in the eastern Sierra could offset some of the effects.